

Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A method of manufacturing a microcomponent assembly, comprising:
providing first and second microcomponents having respective first and second contact areas and having feature dimensions less than about 50 microns;
forming a junction compound on at least one of the first and second contact areas;
positioning the first and second contact areas adjacent each other on opposing sides of the junction compound; and
activating the junction compound to couple the first and second microcomponents.
2. (Original) The method recited in Claim 1 wherein the feature dimensions are less than about 25 microns.
3. (Original) The method recited in Claim 1 wherein the junction compound comprises indium.
4. (Original) The method recited in Claim 1 wherein activating the junction compound electrically couples the first and second microcomponents.
5. (Original) The method recited in Claim 1 wherein the junction compound is formed on both of the first and second contact areas.
6. (Original) The method recited in Claim 1 wherein the junction compound is formed by sputtering.

7. (Original) The method recited in Claim 1 wherein the junction compound is formed by a method selected from the group consisting of:

electroplating;
chemical vapor deposition (CVD);
plasma enhanced CVD;
physical vapor deposition;
ionized metal plasma deposition; and
atomic layer deposition.

8. (Original) The method recited in Claim 1 wherein activating the junction compound comprises heating the junction compound.

9. (Original) The method recited in Claim 8 wherein the junction compound is heated by heating the first and second microcomponents in a temperature-controlled process chamber.

10. (Currently Amended) The method recited in ~~Claim~~ Claim 8 wherein the junction compound is heated by exposing the junction compound to a laser.

11. (Original) The method recited in Claim 8 wherein at least one of the first and second microcomponents comprises a heater element proximate the junction compound and the junction compound is heated by operating the heater element.

12. (Original) The method recited in Claim 8 wherein the junction compound is heated by thermal energy transferred from a gripping mechanism to the junction compound.

13. (Original) The method recited in Claim 1 wherein at least one of the first and second microcomponents is a nanocomponent.

14. (Original) The method recited in Claim 1 wherein one of the first and second microcomponents is a substrate.

Claims 15-27 (Canceled).

28. (New) The method recited in Claim 1 further comprising:
providing a substrate having a third contact area;
forming an additional junction compound on at least one of the third contact area and a fourth contact area of one of the first and second microcomponents;
positioning the third and fourth contact areas adjacent opposing sides of the additional junction compound; and
activating the additional junction compound to couple the one of the first and second microcomponents having the fourth contact area to the substrate.

29. (New) The method recited in Claim 28 wherein activating the junction compound between the first and second contact areas includes substantially simultaneously activating the additional junction compound between the third and fourth contact areas.

30. (New) The method recited in Claim 28 wherein the third and fourth contact areas are positioned before the additional junction compound is activated.

31. (New) A method of manufacturing a microcomponent assembly, comprising:
providing a first microcomponent having a first contact area;
providing a second microcomponent having a second contact area, wherein at least one of the first and second microcomponents has at least one feature dimension that is less than about 50 microns;
forming a junction compound on at least one of the first and second contact areas; and
coupling the first and second microcomponents by:
positioning the first and second contact areas adjacent each other on opposing sides of the junction compound; and
activating the junction compound.

32. (New) The method recited in Claim 31 wherein activating the junction compound occurs before positioning the first and second contact areas adjacent each other on opposing sides of the activated junction compound.

33. (New) The method recited in Claim 31 wherein activating the junction compound occurs after positioning the first and second contact areas adjacent each other on opposing sides of the un-activated junction compound.

34. (New) The method recited in Claim 31 wherein the junction compound comprises indium.

35. (New) The method recited in Claim 31 wherein coupling the first and second microcomponents by the positioning and the activating includes mechanically and electrically coupling the first and second microcomponents.

36. (New) The method recited in Claim 31 wherein at least one of the first and second microcomponents comprises a heater element and activating the junction compound comprises heating the junction compound by operating the heater element.

37. (New) The method recited in Claim 31 wherein activating the junction compound comprises heating the junction compound by thermal energy transferred from a gripping mechanism to the junction compound.

38. (New) A method of manufacturing a microcomponent assembly, comprising:
providing a first micro-scale component of the microcomponent assembly, the first component having a first contact area;
orienting a second micro-scale component such that a second contact area of the second component and the first contact area of the first component each contact a junction compound located on at least one of the first and second contact areas; and
mechanically and electrically coupling the first and second microcomponents by activating the junction compound via thermal energy.

39. (New) The method recited in Claim 38 wherein a feature dimension of one of the first and second microcomponents is less than about 50 microns.

40. (New) The method recited in Claim 38 wherein at least one of the first and second microcomponents comprises a heater element, and wherein activating the junction compound via thermal energy includes operating the heater element.